

Construction Damage to Trees

When a building site is cleared, several large, well-established trees are often left to enhance the aesthetic value of the property. However, within about 2-8 years after the structure is built, many owners are dismayed to see one or more of these trees decline. Symptoms are stunting and browning leaves or needles, thinning foliage, and twig and branch dying. Often trees eventually die. There may be a variety of causes, but damage is often the result of the land clearing and building activities.

Tree Problems in General

Trees can suffer damage from a wide variety of causes. Microorganisms cause some problems, such as root rots and needle diseases. Insects can also cause injury. However, most plant problems are due to adverse weather or cultural conditions that stress the plant. These adverse conditions include freezing, drought, over-watering, and improper fertilizing. Construction activities such as change of grade, soil compaction, mechanical injury, and tree thinning can also contribute to stress.

Symptoms of plant damage resulting from stress sometimes do not show immediately, and may not be obvious until several years after the stress occurred. Symptoms may result from the accumulation of several stress conditions. In addition, the older a tree is, the less likely it is to successfully adapt to changes around it.

Causes of Construction Damage

- **Change of Grade:**

In preparing a building site, soil is often moved in order to level areas which once were sloped, or to slope areas which were originally level. If trees are left standing in these affected areas, they may have soil added over their root systems, or the original soil level over the roots may be lowered. These changes can cause significant damage and even death.

Raising the grade can suffocate the roots. The amount of damage depends in part on the kind of tree, the depth of the fill, and the soil texture of the fill. Several inches of fill over the root system will adversely affect most kinds of trees. Some can be adversely affected by less than an inch of added soil depth. Sandy or gravelly fills are less damaging than heavier fills such as silt or clay.

Placing asphalt or concrete over a root system can have the same suffocating effect as raising the grade around the tree.

Lowering the grade around trees can be detrimental. Most feeder roots are located in the top 6 to 8 inches of soil. Removing soil removes many of these roots which supply the tree with water and nutrients. It also causes

significant root injury. If enough large roots are removed, lack of anchorage may cause the tree to fall.

Grade changes can also affect the depth of the water table. If the grade is raised, the resulting rise in the water table may suffocate roots in addition to the suffocation from the added soil depth. If the grade is lowered, soil water may be less available, and this, in combination with lack of roots due to the grade lowering, may put severe drought stress on the tree.

Other changes in drainage patterns, such as those due to asphalt or concrete driveways, patios, or foundations placed near trees, can result in trees receiving more, or less, water than they originally did, and this can sometimes cause serious damage to trees.

- **Soil Compaction:**

Heavy equipment will compact soil. Repeated walking over the soil will also tend to compact it. Roots growing in compacted soil will be adversely affected, since compacted soil is less open to air and water movement. Sandy soils or soils high in organic matter tend to compact less than heavy, clay-like soils.

- **Mechanical Injury:**

Bulldozers and other equipment may gouge the bark off of the tree trunk or buttress roots, and can also damage roots simply by moving over the root system. Such injuries can be detrimental, not only because a needed part of the tree has been removed, but also because decay organisms may enter the wounded areas. If the bark is knocked off all the way around the trunk, the tree is girdled and will die. Digging trenches for foundations and various underground pipes and cable can also cause serious root loss and damage. The closer the trench is to the trunk, the more severe the effect on the tree. Damaged trees may die or fall.

- **Tree Thinning:**

Certain trees may be removed from a stand to create an area on which to build the structure, to decrease the amount of shade, or to give desirable trees more growing room. When stands of trees are thinned, remaining trees are more exposed to wind, and may suffer wind damage. Wind

damage can range from broken branches to entire trees being broken and blown over. The vulnerability of a stand is increased when the larger trees (with larger crowns) are removed, because the stand is opened to greater influence from the wind. Removing smaller trees will cause fewer problems, because the remaining larger trees are already wind firm. The greater the degree of thinning, and the denser the original stand, the greater the chances for wind damage to the remaining trees.

Preventing or Lessening Construction Damage

- **Planning Ahead:**

Before land clearing and construction begin, mark off the dimensions of the building, driveway, and any other major construction areas. Decide which trees should be saved (or perhaps transplanted) based on their nearness to the construction area, health, age, and species. Then build a barrier to keep equipment away from the remaining trees on the site. If trenching near desirable trees is necessary, tunnel under the root system rather than cutting a trench through a significant portion of the roots. If the grade must be raised around a desired tree, construct a dry well around the tree. For maximum effectiveness, the dry well should extend to the drip line of the tree. Consult a reputable tree specialist for advice.

- **Pruning:**

If damage does occur to the root system, some of the branches of the tree should be pruned out to help bring the branch system back into balance with the root system. When part of the root system is damaged or removed, it can no longer supply the needed amount of water to the branches and leaves or needles of the tree. Removing some branches reduces the water requirement of the tree. Therefore, the pruning should be done as soon as possible after the root damage. Prune by thinning out some branches, but retain the overall shape of the tree. In general, the amount of pruning should roughly equal the estimated amount of root damage or loss. Dead branches should also be removed.

Loose or dead bark should be removed from around wounds, and the wound margin should be shaped with a sharp knife into a vertically-oriented ellipse. If callus tissue (the ridge of tissue around the wound) has started to form, do not cut into the callus. Wound dressing (wound paint) need not be applied unless desired. Testing has indicated it serves no useful purpose, and may be detrimental. Covering wounds with black plastic is however, reportedly beneficial. Four mil black plastic is cut somewhat larger than the wound and held in place by plastic tape which

circles the branch or trunk. Apply plastic immediately after the wound is made, and leave it in place until the wound is completely closed by callus. This may mean replacing the plastic and tape for several years. Pruning and related work on large trees should be done by professionals.

Care After Construction

- **Care for Damaged Trees:**

Many times the owner of a new home or other structure has not been involved in land clearing and construction decisions and has no idea what changes have occurred. Often developers and builders have not taken proper precautions with regard to the trees on the site. This means that damage has likely occurred, but the owner may not be aware of any problems until the symptoms or stress become obvious. By that time, chances of saving the tree may be slim, because effective treatment will be difficult. Even with prompt treatment, severely damaged trees may die. However, the sooner the treatment is begun, the better the chance of recovery.

Damaged and suspected trees should be watered and fertilized properly. Fertilizers containing nitrogen and phosphorous in about equal proportions should be used. Best time for application is in late winter. Phosphate is desired because it stimulates root growth. Nitrogen will generally increase the growth and vigor of the tree, and thus will hasten the healing of trunk scarring. However, it also stimulates foliage and stem growth which might be undesirable unless the tree is watered during dry periods, but be careful not to over water.

Pruning and wound shaping should be done on damaged and suspect trees (see Pruning above). Fills should be removed to the dripline of the tree. Dead trees should be removed. Trees that are a hazard should be cabled or removed. On large trees, all these operations should be done by professionals. Care for Protected Trees: Even with proper land clearing and building, good tree care following construction is still vital. Additional pruning, if damage symptoms occur, may be necessary. Proper watering and fertilizing are also necessary.

- **Long-Term Vigilance:**

Whether or not land clearing and construction activities were proper, trees should be kept under observation for 8-10 years after construction. This will allow prompt treatment if needed.

